

THE MAGNAVOX COMPANY, et al.,

Plaintiff,

vs.

CHICAGO DYNAMIC INDUSTRIES  
and SEEBURG CORP.,

Defendants.

No. 74 C 1030

and

74 C 2510

BEFORE: The Honorable JOHN F. GRADY, Judge.

Monday, December 27, 1976

2:10 o'clock p.m.

Resumed pursuant to recess.

**FILED**

PRESENT:

MR. ANDERSON  
MR. WILLIAMS  
MR. ALLEGRETTI  
MR. BRIODY

H. Stuart Cunningham, Clerk  
United States District Court

appeared for The Magnavox Company;

MR. GOLDENBERG  
MR. RIFKIN

appeared for the Seeburg defendants and  
World Wide Distributors.

THE COURT: Proceed.

RALPH BAER,

called as a witness herein, having been previously duly sworn and examined, resumed the stand, was examined and testified further as follows:

DIRECT EXAMINATION (Resumed)

BY MR. ANDERSON:

Q Mr. Baer, prior to the luncheon recess you described the Odyssey 1 TL 200 as it is shown in the service manual, and you indicated that it was possible to demonstrate the 1 TL 200 here in the courtroom.

Will you now step down and use the television receiver, Plaintiff's Exhibit 6, and the Odyssey 1 TL 200, Plaintiff's Exhibit 7-A, and demonstrate the operation?

A As in the case of the brown box, Exhibit 62, which we demonstrated earlier, we are again connected to the back of the TV set, attached to the antenna terminals through a thin cable, this one (indicating), which is equivalent to this antenna cable, and in this case transmits, I think, on Channel 4.

What I have just done is to insert a plug-in card, such as this one --

Q What is the plug-in card? Is it identified in any way, Mr. Baer?

A Yes. It bears a No. 1, which, if you refer to the instruction book that comes with the machine, tells you it is the card to be used for the ping pong game or tennis game.

Again, we have two control boxes with the same three controls --

Q You mentioned Channel 4. Is that Channel 4?

A That is Channel 3.

Q It is set on 3, correct?

A Yes.

The same controls are for moving the spots horizontally and vertically, and in English control, which is coaxially located with the horizontal control.

Also, we find a reset knob at the top of each box, which is the equivalent to the buttons in the corner of the Exhibit 62 box, and you will find that this game -- let's see. You have to watch it. We are reversed.

(There was a brief interruption, after which the following further proceedings were had herein:)

Q You are still reversed.

A Let's go over to that side. There we go.

Oh, I'm over there. That makes the difference.

Q You are on the left, I'm on the right.

A Yes. It does help to be in the right place at the right time.

Now I will demonstrate the use of that english knob. I will reset it so it will go down.

Q Right now I have to re-serve.

A I missed it, and I have to re-serve it. I will make the ball fly up the next time it's intercepted. Here we go.

Q So that the player can set the english knob in the Odyssey 1TL 200, and that determines the angle that the ball appears to bounce off of his paddle, is that correct?

A That's right.

Q And how do these controls compare to the two brown boxes in Plaintiff's Exhibit 62 as they are now implemented in the actual Odyssey, Plaintiff's Exhibit 7A?

A They are essentially identical.

Q Now, I notice that the styling is different. Is the internal construction the same or different --

A Yes, it is, there are three potentiometers

and one switch.

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Q And you have set the game now by putting the printed circuit card with the number 1 on it in to the main console, and what game is that simulating, or what game is that?

A A tennis or ping pong game, just as we did it with the first cardboard, setting up the switches on Exhibit 62. We have a net in the middle, which is passive, two players, and a ball.

Q When you say the net is passive, what do you mean, exactly?

A It's cosmetic only. It's not interactive.

Q It doesn't produce any effect on the play of the game?

A That's correct.

Q All right, now, I guess you said the printed circuit card with the number 1 on it performs the function of what portion of the demonstration unit 62?

A It essentially does what we did when we moved various switches on the back side of Exhibit 62 to effect specific interconnections between the various circuits inside to create the particular game.

Q All right, to change the Odyssey 1TL 200 to play, say, hockey, what does the player have to do?

A He removes the game card and inserts another

card which is meant to play the particular game he wants to play, and I think this one turns out to be a handball card -- yes -- that's equivalent to the game we played on the box 62 with a fixed wall on the left-hand side capable of bouncing the ball.

Let's get control here. I think you will observe that when I manipulate that ball up against the wall, it comes off that wall in mirror image fashion.

Q Explain what you mean by "mirror image fashion" please.

A Let me get it set up first to where things will happen.

If I turn my english control counterclockwise, you will note the ball will take a left and downward path from my paddle, my paddle being the one I am just wiggling, and it will rebound from the wall at an angle which is the mirror image of the angle of intercept. That is, if I come in at a 30-degree angle this way, I will bounce off at a 30-degree angle from the horizontal that way. I will step back a little bit so it's easier to see.

Now -- oh, sorry -- but it did do what I said.

Let me move the spot out, and it will be easier to see. Now I will turn the english counterclockwise, and the ball will come down, intercept the wall

roughly half way down, and then continue down at an angle roughly equal to that of the angle of incidence -- oops -- goofed it -- I'm not doing too well.

(There was a brief interruption, after which the following further proceedings were had herein:)

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THE WITNESS: You have the English control on, so I lost it.

I will demonstrate on this box. Up she goes. I'm sorry. But every time I turn the knob, it seems to go in the opposite direction.

The object was to demonstrate the angle of incidence equal to the angle of reflection. What I meant was that it comes off the wall mirror-image fashion.

MR. ANDERSON: Thank you.

BY MR. ANDERSON:

Q Mr. Baer, after you completed the work with the Magnavox engineers on the development of Odyssey 1 TL 200 in 1971 and early 1972, I think you said, were you involved at all in the actual introduction and marketing of the game?

A I was involved to the extent that I got invited to the first public showing and had continuing discussions with marketing people at Magnavox. But officially my responsibilities ceased when we got the engineering personnel at Magnavox under way in their initial attempt to get Exhibit 62 reformatted for production.

I did go back to New York in, I believe

it was, May of 1972 to see the first public demonstration of that model Odyssey game.

Q Where was that first public demonstration held?

A I believe it was in a restaurant, Tavern on the Green, in Central Park West, New York City. The showing was held for the press. There was quite a large gathering, maybe 200 people being present.

Q I would like you to look at Plaintiff's Exhibits 7-B, 7-C and 7-D, and I ask you if that refreshes your recollection as to when the press -- as to when the public announcement was made?

A Yes, it does. These are references to that demonstration, the first one being in the Wall Street Journal on May 11th. That is Exhibit 7-B. The second one is a reproduction of a "Consumer Electronics Newspaper" article dated May 15th.

And there is Exhibit 7-C, in which a reference is made to a "Mystery Product Unveiled by Magnavox," which turned out to be a TV game.

THE COURT: As an aside, read the first sentence in the Time Magazine article. That is rather a depressing fact, if it be a fact, I would say.

MR. GOLDENBERG: Your Honor, my curiosity has been aroused.

THE COURT: It says:

"The average American spends six hours a day gazing passively at television."

That corresponds with similar statistics I have read elsewhere. The amount of time that the so-called average American spends watching that television tube is just astounding, especially when you divide it into the number of waking hours he has during the week.

But that has nothing to do with the case on trial.

MR. ANDERSON: Odyssey was supposed to change that a bit.

MR. GOLDENBERG: Read Mr. Buchwald's column this morning.

THE COURT: Buchwald?

BY MR. ANDERSON:

Q You mentioned the reference to a "Mystery Product" in Exhibit 7-C. Is that a term that Magnavox or Sanders used, Mr. Baer?

A There I have to rely on memory. I believe George Frizell, who was then president or chairman of the Consumer Operation of Magnavox, or some such responsible position, had previously talked about a mystery product that was

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about to be announced to the trade, and that is how the term came about. This was the first time they unveiled a mystery product and identified it as a TV game.

Q At the first public announcement who was in attendance?

A Two hundred members of the press and other invited guests.

Q At that first public announcement of the "mystery product" was there any indication from anyone that this was a known product or a product that had been in existence prior to the announcement?

A No, sir.

Q What was the general reaction at that meeting?

MR. GOLDENBERG: Your Honor --

THE COURT: I understand the objection.

On the other hand, I don't know of any other way to get at the information, which I think is relevant. I understand that we are talking about unidentified voices. But it almost is in the area of the "spontaneous exclamation" type of evidence.

I will overrule the objection.

MR. ANDERSON: Thank you, your Honor.

BY THE WITNESS:

A I can say this much, that in addition to Odyssey, in fact preceding the demonstration of Odyssey at that public showing, a number of other products were shown, and in fact Odyssey was the one product

that caused a considerable amount of commentary and discussion and visible agitation among all those that were present there, although they had showed some significant other new products. They showed a new TV camera, if I remember right, and a few other products that should have aroused some interest but didn't.

BY MR. ANDERSON:

Q Mr. Baer, in your initial testimony, you referred to Plaintiff's Exhibit 64-2 through 64-6, your longhand document of September, 1966.

THE COURT: What is the number?

MR. ANDERSON: 64-2 is the number of the first page, and it runs through 64-6.

BY MR. ANDERSON:

Q Mr. Baer, at the second page of that document you read into the record your longhand entry concerning the manner in which your proposed game would be hooked up to a TV set.

Can you either summarize that or reread it, please?

A I think it is just as easy to read it. If you go to the fourth line, it says:

"Entry into the TV set is to be obtained either through direct connection to the video system (at the second detector) or by con-

"nection to the antenna terminals, thus substituting the entire device hereinafter called generator for the broadcast TV signal," and so forth.

Q Did your group at Sanders design any games or build any games which would be attached to the TV display in both of the manners you have discussed in your longhand disclosures, 64-3?

A Yes, we have.

Q With respect to the ones that you have described so far, are they all in the category of being attached to the antenna terminal directly, or are they in the other category of being attached to the second detector?

A I think we have some of both, although we only talked about those that entered the set via the antenna terminals.

Looking at the exhibit with the three position switch this morning to refresh my memory, that box was built in several different ways, and I believe some of Harrison's notebooks will bear out what I remember now.

Baer - direct

That particular game was used with that RCA color TV set which I referred to earlier, which we bought for the TV game activity early in '67, and through discrete wires coming out of that box, out of the TV game chassis, and interconnection of those wires to the video section of that RCA set, we played games in the second manner described in the reference which you just had me read.

So we did have a game going -- in fact, several times, during the program that we interconnect the game circuitry with the guts of the TV set, rather than enter through the antenna terminals.

Q What is the significance of going, either construction-wise or functionally, in going directly into the video amplifier of a TV display versus going in on the antenna terminals, as you have described it?

A Well it does a number of things. First of all, it responds to what I thought was a real product need on the market --

Q When you say "it" excuse me, which are you referring to?

A -- product need in the market.

I thought there were two ways of selling TV games. No. 1 is discrete entities that get connected to TV sets through the only terminals available, namely,

Baer - direct

the antenna terminals, and, No. 2, that TV games could be built into TV sets as part of the manufacturing process and sold that way. In fact, it's being done that way just now. And in order to demonstrate that second method of making and operating TV games, we had interfaced this with a three-position switch with our color RCA 19-inch TV set back in the September-October area of 1968.

Q I would like to hand you Plaintiff's Exhibit 65-261, and ask you if that relates to a game which was constructed by your group for going directly to the video amplifier of a TV display?

A Yes, it does.

Q Will you briefly describe what's shown in that diagram, perhaps pointing out the various functional blocks, and then how it was used in conjunction with a TV set to get a direct display?

A Yes, sir. To begin with, if you look towards the right-hand side of 65-261, you will notice the same groups of triple circles, that is, the same three-position switch, and the reason for that is simply that the schematic we are looking at represents the same box we looked at this morning, the same schematic, but if you look in the upper left-hand corner of this schematic, you notice an arrow going upwards with the words "From horizontal output XFR,"

which stands for transformer, horizontal output transformer, and that refers to an interconnection to a TV set, specifically to that section of the TV set which contains the horizontal output transformer, which, in turn, has the function of sweeping the picture tube from left to right and moving the beam from left to right, so this schematic clearly refers to a TV game which was hard wired into a TV set, and, furthermore, if you look at the bottom of the page, you will see the notation just above a little circle, "Video to TV," and if you analyze the schematic, you will find that that is video information at that point, and what is intended here, and what was done, was to connect that point to the input of the video stages of the TV set without the intercession of an R.F.Oscillator, modulator, the whole front end of a TV set that are used in TV games of the type we just played in the courtroom.

Q Now, where there is reference at the upper left-hand corner of Exhibit --

Your Honor, Mr. Williams has just pointed out I misidentified this particular exhibit about which Mr. Baer is testifying. It should be Plaintiff's Exhibit 64-261, not 65-261.

THE COURT: Mine says 65.

MR. ANDERSON: I know. That's my writing.

THE COURT: Oh, I see. It should be 64?

MR. ANDERSON: Yes, your Honor, it should be 64-261.

BY MR. ANDERSON:

Q Mr. Baer, in Plaintiff's Exhibit 64-261, in the upper left-hand corner, where it says, "From horizontal output XR," which you said means from horizontal output transformer, is that an output from the game circuit, or an input to the game circuit?

A That's an input to the game circuit, even though the arrow points out. It simply means the connection goes into the TV set. It's really an input. In fact, it's the horizontal sync pulse, or the equivalent of the horizontal sync pulse.

Q And is that a necessary part or input to the game circuit of Exhibit 64-261?

A Yes, it is.

Q Now, in your other circuits that you have explained this morning, was there such a connection, or how was that pulse provided?

A No, that pulse was provided in all the other data we looked at this morning by a circuit which was labeled "Horizontal sync generator" or "Horizontal oscillator," within the TV game box.

Q Now, in using the circuit of 64-261, as you have testified, attaching it directly to the video amplifier, is there any detriment in the manner in which your game circuits operate in conjunction with the TV set because of that?

A No, sir.

Q Is there any difference in the TV signal format that's employed to play the game where you go directly to the amplifier?

A No. We again, if you look at the various constituent parts here, we provide all the video that's required, directly to the input of the video amplifier of the TV set.

Q Mr. Baer, having described all of these rather complicated circuits and the manner in which they function, can you describe how the TV set actually knows where to locate the two paddles and the ball and the walls in response to the manipulation of the game?

A Well, if you recall, a TV picture is nothing really but a series of horizontal lines traced successively starting at the top and going down, and to paint anything on a TV set means brightening up a part of those lines in a particular place where you would like something to show on the screen, and that means that you must do whatever you are doing in time relation to the start of each individual line.

If you were trying to brighten up a segment of a line centrally located on the TV screen, then you must wait for the appropriate time for the beam to go from its reference point, the left-hand side, or synchronization time, to the center, and since the length of time it goes from left to right is fixed by the rules of the game, namely, the format which we transmit our TV pictures with -- we know that to be roughly 63, 64 microseconds,-- and if you were to place -- were to displace something near the center, you know you must delay whatever you are going to show someone half of 63, or, say, 31 microseconds past the instant in time where the horizontal sync pulse occurred.

So, if I want to place something halfway across the screen, I allow the tube to brighten up a spot some 60-odd microseconds after the time it had been told to start traveling forward, and then I would

allow that spot to remain bright for the length of time I would want the line to be brightened.

If I wanted, say, a one-inch line to show up -- one inch out of 10 being one-tenth of the time -- I would allow that spot to stay bright for, say, one-tenth of 60 microseconds.

So you can see it's all a question of timing with respect to the horizontal sync pulse. From the beginning of the line, you time how long you want to show something, and then you shut it off, and you repeat that on the next line, and the next line, if what you are trying to show as height, as a rectangular spot has in the case of a paddle or in the case of a ball.

Q Now, you say that those locations of the paddle or the ball or the wall are determined by timing relative -- what, synchronized relative to some other pulse or phenomenon in the circuit?

A With respect to horizontal sync wherever that comes from, in most cases a horizontal sync generator provided in the box. In this case, in the case of a direct video connection, sync pulses came directly from the TV set.

Q Now, if the ball, for example, is continuously moving, as you testified, can you explain how, in this context of synchronized timing, the ball is caused to

move up or down or left or right in just the same general terms that you have described the phenomenon?

A If you think back to motion picture analogy, motion is created by having successively different pictures shown on the screen. By different, I mean picture in which the moving object is in a slightly different position in the second frame with respect to the first frame.

Well, we have similar frames in television. After you finish scanning to the bottom of the TV screen with the last horizontal line, you start all over at the top. You effectively have ended one frame and have started a new one. Motion is accomplished by showing the position of the moving object slightly different place in the next frame as compared to the prior frame, which means that you must change the timing of the thing you are showing or displaying with respect to horizontal sync and vertical sync by some amount in order to show that it has moved.

For example, if the spot were to move to the right and down, you would want the display to appear a little later along the horizontal line than it had before, further off to the right, and you would like it to appear a little later with respect to the top of the start of the picture, which is vertical sync, so it,

in effect, gives the appearance of having moved down.

So, by increasing the timing between vertical sync and horizontal sync, you effect the apparent displacement of the spot, and the result is interpreted by your eyeballs and your brain as apparent motion.

Q Is there any way that you could describe a little more in terms of circuitry, general circuitry, how the circuit produces that time shift that causes the ball to move down or across the screen that would be generic to all of the games that you are familiar with, whether you have developed them yourself or not?

A Well, in most instances the up and down movement of a paddle, for example, is effected, to begin with, by turning a knob in the hands of a participant. That knob rotates a control on the inside of the machine which produces a varying DC voltage. It is just as though you are changing the value of a battery attached to a wire coming from the potentiometer.

This DC voltage reaches into a circuit that is responsive to that DC voltage. That circuit's function is to put out a pulse waveform that is delayed over another pulse waveform. That other pulse waveform, in our case, turns out to be either horizontal or vertical sync.

So when you turn a knob and vary the voltage, that voltage tells that circuit to generate a pulse that appears sometime later than the pulse that went into it.

That is a pulse delay circuit.

There are many ways of doing that.

In the TV game we need two such pulse delay circuits, one to delay a pulse with respect to horizontal sync, so as to get displacements from the left-hand edge of the screen, and another pulse which is displaced with respect to vertical sync, so as to get displacement from the top of the set.

In the case of the Odyssey machine, we demonstrated some time ago both those knobs were actually available to the participant. One was capable of providing the vertical delay, and the other one the horizontal delay, and the result was motion in both directions. That is why we could move the player spots, the paddles, on that machine over the entire screen.

Q Are you familiar at all with the coin-operated video games that are in the field today?

A Yes, I am.

Q Would that description of timing pulses to cause the ball to move and paddles to be positioned apply to all of the games that you are familiar with that use TV displays?

A With respect to the games I am familiar with, the vertical motion of the paddle is generally affected by an integrated circuit device that is usually a Type 555 timer, which is nothing but a pulse delay multi-vibrator,

which works identically as the circuits which we just talked about operated, in that it is responsive to a DC voltage coming from a control, which is the control the human participant turns to move the paddles up and down in order to move the player spot, the paddle, up and down the screen.

Q To the best of your knowledge, is that true of the Seeburg and Chicago Dynamics games that you have seen?

A Yes, it is.

Q Do you know of anyone who used that particular time delay relationship between pulses to display moving balls and paddles prior to the time that your group did it in Sanders?

A No, sir.

THE COURT: May I have the last question and answer, or the last question, please?

(The record was read by the reporter as requested.)

MR. ANDERSON: Your Honor, that completes the direct examination of Mr. Baer.

We would identify all of the laboratory notebooks and documents that have been produced in the course of the discovery depositions, and Mr. Rusch and Mr. Harrison's testimony will in part refer to them. But I have no desire to go into them at all at this time.

THE COURT: All right.

MR. ANDERSON: I will just read into the record what they are.

The first is a blue laboratory notebook, Plaintiff's Exhibit 66.

The second is a red laboratory notebook, Plaintiff's Exhibit 67, which has the name "William

Baer - direct  
- cross

"L. Harrison," and the date "5-11-67" on it.

The next is Plaintiff's Exhibit 68, bearing the name "William T. Rusch," issued 10-28-66.

The next is Plaintiff's Exhibit 69, a laboratory notebook, bearing William T. Rusch's name and issued 10-18-67.

The final one is a laboratory notebook, Plaintiff's Exhibit 70, bearing the name William T. Rusch, and issued 11-29-67.

In addition to that, there is also reference in the transcripts to Plaintiff's Exhibits 64, a folder of loose documents produced in the Sanders group, and bearing the legend "TV Game Data in Chronological Order, 1 September '67 to 8-21-69."

Finally, another collection of loose documents on the same subject, Plaintiff's Exhibit 65.

(There was a short interruption, after which the following further proceedings were had herein:)

THE COURT: You may proceed, Mr. Goldenberg.

CROSS EXAMINATION

BY MR. GOLDENBERG:

Q Mr. Baer, I believe you testified this morning

Baer - cross

in response to a question from Mr. Anderson that prior to the work of Mr. Rusch, which resulted in the Reissue Patent 28,507, you had never encountered any movable hit symbol which moved continuously around on the surface of a television screen?

If that is not quite correct, do correct me and tell me what your testimony is there.

A I think what I testified to is that we had never seen a symbol which moves about the screen, either partially or wholly under the control of a machine, and with which the symbology on the screen, which is manipulative by the player, by the participant, namely the paddles in this case, can interact in such a way as to alter the path of a moving symbol.

Q Had you ever seen prior to that work of Mr. Rusch the generation of a symbol on the screen of a television which did move around continuously under the control of some electrical or electronic circuit?

A No, sir.

Q You never did? Are you sure of that, sir?

A Again, certainly in the context of a symbol --

Q No, sir. I want you to answer my question, if you will.

A I am trying to understand your question.

Baer - cross

Q Perhaps the reporter can read it back.

(The record was read by the reporter  
as requested.)

BY THE WITNESS:

A ' The answer stands. It is no.

BY MR. GOLDENBERG:

Q Didn't you testify on the first day of this trial  
that in June of 1967 you and your associates at that time  
demonstrated the TV game that you had completed to Mr. Sanders  
and Mr. Etlinger at Sanders Associates?

A That is correct.

Q And that was in June of 1967, wasn't it?

A Yes, it was.

Q Do you happen to recall the date offhand?

A I believe it was June 6th.

Q Wasn't one of the games that you demonstrated at that time a target game?

A That is correct.

Q And in that target game, wasn't the spot the target moving around on the screen of the television receiver?

A Yes, but it was not moving automatically. That spot was being manipulated by hand, by having someone participating in the game, in the room, manipulating a horizontal or vertical knob so as to provide a little variety to the game.

Q Wasn't there an electrical oscillator or something making that spot move around?

A No, there was not.

Q It was not?

A It was not.

Q I direct your attention to the patent, which is Defendants' Exhibit --

(There was a brief interruption, after which the following further proceedings were had herein:)

MR. GOLDENBERGER: Excuse me for a moment, your Honor.

At this time I would like to hand up to the Court Defendants' Exhibit 9, which is

the prior art on which we are going to rely,  
and as a separate defendants' exhibit, U.S.  
Patent 3,728,480, which is Defendants' Exhibit 1,  
that is, both in the binder and there separately.

BY MR. GOLDENBERG:

Q Mr. Baer, are you the patentee in U.S. Patent  
3,728,480?

A Yes, I am.

Q I show you a copy of that patent and ask you  
if that patent does not disclose within its text the  
concept of using some kind of voltage generator to cause  
a spot to move around the screen of a television re-  
ceiver not under the control of a player?

A I know of no instance wherein this patent  
refers to the use of a voltage control to move a spot  
on a television receiver.

Q I direct your attention to column 12, line 57,  
the paragraph beginning there, and I will read it to  
you -- or do you want to take the time to read it to  
yourself?

(There was a brief interruption,  
after which the following further  
proceedings were had herein:)

BY THE WITNESS:

A I have read it.

BY MR. GOLDENBERG:

Q Have you had a chance to read that paragraph, sir?

A Yes, I have.

Q Doesn't that disclose the concept of moving a spot around on the screen of the television receiver automatically by the use of some voltage means?

A It suggests that, yes.

Q Well, I direct your attention to claim 25, which is in column 15 of the patent. Doesn't it in fact claim that as part of the invention of that patent?

A Yes, it does.

Q I am sorry.

A I said yes, it does.

Q Now, isn't it a fact that the work that you did before Mr. Rusch joined your team is the work that resulted in the '480 patent?

A Correct.

Q And the subject matter of the '480 patent is the device that was or the devices that were demonstrated to Sanders Associates people in early June, 1967? Isn't that correct?

A That is correct.

Q And that had raster scan, did it not?

A Yes.

Q Did it have control of the horizontal and vertical positions of moving spots?

A Yes, it did.

Q By the player? It had coincidence, did it not?

A Yes, it did.

Q What happened when you had coincidence in that device that was being demonstrated?

A Well, to the best of my recollection, coincidence between two symbols on a screen resulted in a change of background color or the change of a spot. I don't know which.

Q Wasn't there a form where one of the spots would disappear when it was coincidence?

A There was one time. I don't know if it was shown in this particular game that was demonstrated in June of 1967 or a later one.

Q In response to a question from Judge Grady this morning as to what was the difference between a ball and a spot, I believe you answered that ball was different because it could be moved by both machine and player, is that correct?

A I believe that is correct in part. I don't know whether it was at that point or whether it was later on in the testimony that I added to that explanation

another necessary ingredient, in that the ball must not only move either under machine or manner control, but also be capable of interaction with other symbology, namely the panels on the screen which affected this path after intersection.

Q All right, so let's be sure we have this, then. If I understand, there are now two elements. It must be capable of being moved by both the machine and the player, and it must be capable of interaction with some other symbol being displayed on the screen of the television receiver, is that correct?

A Essentially.

Q Well, sir, with respect to that, wouldn't you agree that this form of the game where the ball was moved -- I'm sorry, forgive me -- the spot was moved around automatically, as in a target shooting game, and then you had coincidence, and when you hit the target, the spot disappeared, that meets all of those requirements that you gave, doesn't it?

A Well, it does not.

Q What requirement doesn't it meet?

A It does not meet the requirement that the spot which we came to, whether it was a ball spot or a hit spot, changes its direction after intercept.

Q Oh, I see, so your complete answer is that it isn't just interaction, there has to be a change of direction.

A Change in path, change in direction.

Q Change in path, not just disappearance, or changing color?

A That's correct.

Q Suppose you had a driving game, automobile game, and there's some suggestion in some of these documents here where you have the sides of a track, and your symbol represents an automobile, and the player is driving the automobile, and the automobile bounces off the side of the track; is that ball or is that a spot?

A If the symbol which you call an automobile truly bounced off the side wall, I would characterize it as a ball.

Q Even though it looked like an automobile?

A Certainly by my definition of a spot that changes its direction upon --

Q Doesn't it really boil down to this: It's a ball, because you say it's a ball?

A Well, I think it's more than that, Mr. Goldenberg. I think it's a ball because it acts like a ball, looks like a ball, and plays like a ball.

Q But there is nothing -- it can be the same spot -- the same symbol can really be any different number of things, can't it?

A Yes, if your imagination allows you to associate a spot with something else, certainly.

Q Would you agree with me that, in a great number of the claims in Reissue Patent 28,507 and 28,598, it's

not called a ball at all, it's simply referred to as either a -- it's referred to as a hit spot?

A That's right.

MR. ANDERSON: Your Honor, I would object to testimony about claims or claim interpretation by this witness. I don't think that was within the scope of the direct, and the interpretation of the claims is a legal interpretation.

THE COURT: Overruled.

BY MR. GOLDENBERG:

Q Mr. Baer, when did Mr. Rusch join your group?

A Roughly in March of '67. He did not actually join the group in the sense of becoming responsible to me formally until sometime later that year, but our first contacts and discussions, and resultant suggestions and interchange of ideas, between Rusch and myself, took place around about March of '67.

Q My question was when did he join the group?

A Well, let me say this, Mr. Goldenberg, in explanation of how we operated Sanders. We very frequently move engineers about without formally reassigning them to a new supervisor, but, to all intents and purposes, that person, at least for that part of the day, works on a job or task and is under the responsibility of some senior supervisor, he works for that man, is in

his group, though not formally, organizationally transferred, and it was in that kind of capacity that Mr. Rusch reported to me back in March, April, thereabouts of '67.

Q Well, would you agree that the records would indicate that he was formally assigned to the group in July of 1967?

MR. ANDERSON: I would like to object, your Honor. We have a stipulation, paragraph 30, specifically on this subject, which reads:

"The subjects matter of each of the patents in suit resulted from work done at Sanders by a research group which first included Ralph H. Baer and at least as early as May, 1967 also included William L. Harrison and William T. Rusch."

MR. GOLDENBERG: Is that our stipulation?

MR. ANDERSON: Yes, that is our stipulation.

MR. GOLDENBERG: I would still repeat my question, your Honor, and I will get to complete this matter shortly, and I don't think the stipulation affects what I am about to show.

THE COURT: All right, overruled.

MR. ANDERSON: Well, your Honor, if the reference --

THE COURT: I would agree that if it's stipulated,

that ends the matter, except Mr. Goldenberg indicates he has another purpose for asking the question, and on that basis, I am overruling the objection.

MR. ANDERSON: I understand, but I was trying to make another point, and that is if the witness is being interrogated about the records, then the records should --

THE COURT: Well, I think that's true, but perhaps these records are known to all of you.

MR. GOLDENBERG: I think we do know the records, your Honor, and if Mr. Baer doesn't know the answer, we will go to the records, to the extent we have to. I thought he might, and we would just shorten the matter.

BY MR. GOLDENBERG:

Q Do you know the answer to that, sir? My question was wasn't he formally assigned in July of 1967?

A Yes, I believe so.

Baer - cross

Q Now, what work did Mr. Rusch do starting at this time that you said he first joined the group? What role did he play?

A If you are referring to that work which he did for me in connection with TV games, he participated in a number of meetings during which we discussed what we might do with some of the rudimentary things I had done up to this date, and he was invited to come up with some ideas, Mr. Rusch being a very creative person, and he went away to his office and produced some papers subsequently, which I think we read into the record here, because they resulted in a memo that showed up about May, early May, typed by my secretary at the time for Mr. Rusch, addressed to me by Rusch.

Q All right, sir, beyond preparing that memorandum-- I apologize for the failure of our records not to have it at hand --

THE COURT: That was 66-44.

MR. GOLDENBERG: We apologize, your Honor.

BY MR. GOLDENBERG:

Q I show you a document, Plaintiff's Exhibit 64-44. Is that the memorandum that you have in mind, sir?

A Yes, sir.

Q Now, beyond preparing that memorandum, what else

did Mr. Rusch do at that time?

A I don't believe he did very much at the time. He was still assigned to the Corporate Director of IR&D, Mr. Campman, and in that connection, he had other duties, so what time he spent working for me was limited. The only activity that we can recall having taken place relates to that that was involved in generating this memo.

Q Well, now, I believe you testified that there was a company requirement of keeping a daily record of bench activities?

A That's correct.

Q So if we wanted to find a record of Mr. Rusch's activities, we could look in his notebook, couldn't we, to find it there?

A You could, providing he adhered to the corporate director and filled out a notebook page for every day he was at Sanders.

Q Mr. Baer, I show you Plaintiff's Exhibit 68, which is Mr. Rusch's notebook, and the first entry I can find in that notebook, with respect to TV games, is on page 95, and the top of that page is dated September 25.

THE COURT: '67?

MR. GOLDENBERG: '67.

THE WITNESS: '67, your Honor.

Baer - cross

BY MR. GOLDENBERG:

Q Are you aware of any earlier entries in that notebook?

A No.

Q So that it would appear that Mr. Rusch gave you a memorandum in May, and then his first recorded activities are -- that is, in May of '67, -- and his first recorded activities are in September of '67, is that right?

A That is correct.

Q And he had nothing to do with the device that was demonstrated to Sanders Associates management in June of '67, did he?

A Not to my recollection.

Mr. Goldenberg, may I say something before you take the notebook away from me?

Q Certainly.

A That notebook of Harrison's indicates that during the period prior to September, '67, he worked on another project unrelated to TV games.

Q You said "Harrison."

A I mean Rusch. I'm sorry.

Q You meant Rusch?

A Rusch. That project was also under my cognizance, so we were in daily contact through that period via that

program.

Q I see, sir, but he was not working on TV games during that period, was he?

A What I indicated is we undoubtedly had informal discussions that simply didn't get into the notebook at least some time around July or October of that year -- I mean July or August of that year.

Q But none of that is recorded in this notebook?

A No, sir.

Q Do you have any knowledge of any other notebook or document --

A No.

Q -- in which such work might be recorded?

A I do not.

Q All right, sir, I believe you described to some degree the business of Sanders Associates. I don't know that it was very complete. But I would ask you, in this period, 1966-1967, could you describe what the business of that company was?

A Yes, certainly. At that time, as well as at the present, Sanders Associates is engaged largely in the development, and, in many cases, the manufacture of equipment for the military, specifically for the Defense Department. Most of the equipment is in the nature of counter-

measures equipment. Radar countermeasures, as an example, are predominant in the kind of products we develop and manufacture for the Navy, the Army, the Air Force, foreign governments, and also infrared countermeasures, anti-submarine countermeasures are typical of the sorts of things we do at Sanders, for which we employ quite a few hundred engineers, and several thousand production workers and technicians.

Q Now, at that time you were the manager of the equipment design division, is that correct?

A That's correct.

Q What was the responsibilities of the Equipment Design Division?

A The Equipment Design Division was then, and it is today, a functional organization in the sense that it has capabilities for providing electronic engineering, mechanical engineering, such functions as printed circuit layout, reliability analysis, and many other functions necessary for the development of electronic equipment, on the basis of support to other divisional entities within the company.

As an example, a division might be contracted for a radar countermeasures device. That division would come to the equipment design division, it would come

Baer - cross

to the division then as they do now, to ask for support in developing some portion of an electronic piece of equipment required to countermeasure a particular radar and to come to that division to get support for mechanical engineering, designing, drafting, reliability estimates, measurements, radio frequency interference protection, and all the usual electronics functions that surround the design of a complex piece of electronics gear.

Q In 1966-1967, was Sanders Associates in any business involving the use of cathode ray tube displays of any kind?

A Yes, we had had, in the company, a number of display jobs related to the military, in which cathode ray tube displays were used to show data pertinent to the particular requirement. I find it difficult to place these activities, as I remember them, though, with respect to the 1967 date. I don't know which of the programs took place before or after, because, in any event, they weren't related.

Q Wasn't Sanders Associates at that time in the business of making and selling cathode ray tube terminals?

A No, sir. That division which you are referring to is Sanders Data Systems Division. That didn't come into being until much later in the 1960s. I don't believe it existed then.

Q Well, I will come back to that.

Do you know a Mr. J. H. Gassler at Sanders Associates?

A Yes.

Q What was his area of interest in the company, if you know?

A I remember. John Gassler was hired and stayed with us for a year or a year and a half. He was involved during that period of time with writing proposals, I believe to the Navy, on airborne display systems of some sort. I don't recall which one it was. There were a whole series of those.

Q Did any of those display systems involve cathode ray tubes?

A Yes. They all did.

Q Do you know what kind of things were being displayed on those cathode ray tubes?

A Not specifically with regard to the particular

proposal he worked on at the time, but typically what was displayed were graphics, in most cases alpha-numerics, maybe mapped details or pictorials that were representative of a surface area or a surface area such as a map. That sort of thing.

Q What is the relationship between the cathode ray tube and the television receiver?

A The relationship between the cathode ray tube and the television receiver is that in the television receiver what is commonly referred to as the picture tube is one form of a cathode ray tube.

Q Do you know whether any of the cathode ray tube display devices that were being proposed during the time of Mr. Gassler's employment used raster scan?

A To the best of my recollection, they did not.

Q Now, sir, I believe it is your testimony that in August of 1967 at a bus station this idea came to you. Am I wrong on the date, sir?

A Yes, you are. It is the year before.

Q August of 1966. Forgive me.

And that in the fall of that year you began work in your laboratory, is that correct?

A That's correct.

Q In that work I believe you testified that you had in hand in the laboratory a certain piece of

test equipment, and that you could use that test equipment to get your necessary horizontal and vertical sync signals, is that correct?

A That is correct, sir.

Q Now what was that piece of test equipment?

A It was a Heathkit service instrument, intended to allow a serviceman to check such things as what was called the conversions of the three guns, the three color guns, in the color TV set, the ability of the TV set to project the red and blue and green spot into the same place, but in addition to that, this Heathkit device had some other functions to help line up the various variable controls on a color TV set.

Q Would I understand correctly that it was a commercially available piece of test equipment for color television receivers?

A It was not commercially available as an instrument. Like all Heathkits, it came in kit form, and you had to put it together first.

Q But it was a commercially available kit?

A Yes, it was.

Q And its purpose was to perform certain tests on television receivers?

A That's right.

Q What did you have that in your laboratory for?

A I bought that specifically because it contained a number of elements, namely the horizontal sync generator and vertical sync generator, and also, more importantly, an R.F. oscillator modulator, all of the elements I thought I would need for a TV game, so that I could save myself the job of breadboarding these things physically.

Q You bought it specifically for the purpose of this, sir?

A Yes, sir.

Q This is on page 96 of the transcript of the first day of the trial here, and in response to this question:

"Q Were those signals generated within this equipment that you built, or did you obtain them from some other source?

A No, I had handy, at hand in the laboratory, a piece of test equipment."

Now, do I understand now that what you meant there was that you bought it, that you did not have it at hand?

A Right. I could have been more explicit on the first day of testimony.

Q Did you go out and buy a television set also?

A Yes. Somewhat later.

Q What did you conduct your initial test on?

A The black and white portable television set that was sitting around the lab.

Q What was that doing in the lab?

A I haven't the foggiest notion. But when you operate in a lab with several hundred technicians and several dozen engineers, it is always a good chance that there are TV sets sitting around that need a repair, that manage to stay there for years on end.

We have quite a few of them sitting there right now.

Q Returning to the June 1967 demonstration, for a moment, wasn't coincidence there used for two

different kinds of games, and I'm talking about the games demonstrated at that time.

A I believe that is correct.

Baer - cross

Q One was a chase game. Could you explain the chase game?

A Yes. In the chase game two symbols on the screen, which were manipulative by controls, were moved about the screen in such a way as to cause one to catch up with the other, if you were adept enough to do so. Upon catching up or physically superimposing part of one spot over another on the screen and detecting that coincidence, some resultant action happened.

I do believe during that demonstration the result was the disappearance of the chased spot.

Q What was the other game in which coincidence was used?

A I believe the target shooting game. No. It is a different form of coincidence. You would have to refresh my memory, Mr. Goldenberg.

Q I'm sorry, sir?

A I said you would have to refresh my memory. I don't recall at the moment.

Q I had in mind the target game. You may not consider that to be a coincidence game.

A I said it is a form of coincidence --

THE COURT: He doesn't recall what kind of effect occurred.

THE WITNESS: It is a different kind of coincidence.

THE COURT: He wants to know if you can refresh his recollection.

THE WITNESS: He has just done so, your Honor. If he considers the target game as having coincidence, then indeed we are on the same wave length.

THE COURT: What happened?

THE WITNESS: In the target game, when you pointed the toy rifle at the screen in such a way that an image of a target spot, one of the spots, on the screen came through the barrel of the rifle and impinged on a photosensitive element, and you pulled the trigger simultaneously, which closes the switch and told the machine that at that precise moment you had looked at a spot on the screen through your photocell, and that there occurred a coincident happening of all the events, which would tell the screen to do something, which in this case again was to wipe off the dotted spot. And it did it.

THE COURT: Would that have anything to do with sync?

THE WITNESS: It certainly does, in that all the spots on the screen, your Honor, are up there in exactly the same fashion as the paddle spots. They

generate waveforms related to horizontal and vertical sync.

THE COURT: How would the gun come into that kind of play?

THE WITNESS: The gun is a link between the target spot and the coincidence circuitry inside the machine that tells that circuitry, yes, indeed, I have just looked at that spot, I was lined up with it, I wasn't pointing somewhere else, and that while I was pointing at it, I had indeed pulled the trigger at the exact right moment, and all these things came together at that time coincidentally, and the machine pronounces that a hit was obtained.

BY MR. GOLDENBERG:

Q After the June demonstration, or at that time, did you come to any view as to whether or not you had achieved some degree of success in what you started out to do?

A Yes, Mr. Goldenberg. We were encouraged by the response of people who saw the demonstration, not just Etlinger and Campman, but members of the board of directors, specifically the president of the company and the chairman of the board, and were encouraged by these people to move forward.

Baer - cross

It was indeed my feeling at the time that such elementary things as moving two spots around the screen was enough to make a viable commercial product.

THE COURT: You say was not?

THE WITNESS: Was enough.

THE COURT: Was?

THE WITNESS: Was enough, yes.

BY MR. GOLDENBERG:

Q Was one of the purposes of this demonstration to see if additional funding could be obtained for this work?

A Well, that is always the purpose of a demonstration in an engineering environment.

Q Did you get the additional funding?

A Yes, we did.

Q And later on the application for the '480 patent was filed, based on the work up to that time, isn't that true?

A That's right.

Q I would take it that when Mr. Rusch began his activities full time, if I can put it that way, in September of 1967, on the TV games project, do you know personally whether he had seen or been exposed to the earlier work that you had done by yourself?

A Certainly he was.

Q Now, in January of 1968 there was another demonstration outside of the four walls of your laboratory, so to speak, wasn't there?

A Yes. That demonstration was conducted in a screen room on the same floor of the building, but outside the walls of that lab.

Q By that I meant, and I trust you understood it this way, as to people who were not employees of Sanders Associates.

A That's correct.

Q Who were those people?

A The first individual to come up was a Mr. Hubert Schlafly, who was then a vice president of Teleprompter Corporation, and subsequent to that another senior individual from Teleprompter came up to see the demonstration, referring to Irving Kahn.

Q What did they see when they came?

A They saw a demonstration of a unit which we had in evidence here earlier today, and also last time we met here, with which we demonstrated a number of games, specifically a tennis or ping-pong game, the chase game, the rifle, target-shooting game, perhaps one or two others. I don't recall.

Q Was that a satisfactory demonstration in the sense that the equipment did what you expected and hoped it would do?

A Well, if you are asking whether the equipment worked, yes, it did.

Q And this was done in conjunction with the television receiver?

A Yes.

Q Did you go in through the antenna terminals, or did you go in some other way?

A No, we went through the antenna terminals, Mr. Goldenberg.

Q And you did say it includes a ping-pong game?

A Yes. Either ping-pong or tennis. The same thing, really.

Q The ball bounced off the paddles, and such?

A That is right.

Q Was there any bouncing off of a display wall in that device at that time?

A No.

Q Was there any bouncing from the edge of the television screen?

A No, sir.

Q What happened if the ball was hit and then, say, went up toward the top of the screen?

A It disappeared.

Q How would you get it back into the field of play?

A By pushing a reset button or sliding a reset switch. I forget which on this particular model.

Q The device demonstrated -- would you call that a prototype? I know in different engineering organizations you get different nomenclature for projects at various times.

What would be your name or description of the device that you demonstrated?

A This certainly was no prototype. There is

really no argument as to what a prototype is. A prototype is a machine built exactly as production is going to be built, except with non-production tooling. This was anything but prototype. This was a breadboard.

Q By that you mean parts were mounted on some pieces of board so that you could move them around from one location to another?

A I think as we tried to define in court last time we were here, a breadboard is a generic term defined to include assembly, usually the first time around, trying to get components into a functioning unit without regard to size or shape in which the parts were assembled. It has very little regard to the physical format that it might take in a producible machine.

Q This wasn't the first time around, was it? There had been earlier demonstrations.

A With other breadboards, Mr. Goldenberg. Not with that particular one.

Q What was the purpose of that demonstration, sir?

A We were struggling at the time with the question of what to do with TV games. It wasn't evident at the time that one of the ways to proceed was to license the technology of someone outside, and we were considering the question of whether we could produce such games ourselves. Since we are not known to have a low cost manufacturing and assembling capability, since we deal with very expensive and exotic equipment as a normal function of our business, it wasn't very

evident to us that we ourselves could make commercial consumer product devices successfully for the marketplace.

We were struggling with the question of what to do with this whole development, and one of the things that came to mind early in the program was the concept of perhaps it might be something that the emerging cable TV industry would be interested in, in the sense that cable could transmit signals that would provide, say, the background for a baseball game, or, in this case, a ping-pong game or hockey game, so as to enliven the process of playing games. Particularly since we always had color in mind, and it would be nice if one could put up a green ballpark with all the necessary details on that screen while playing a game over that nice, pictorial background.

That was what was in our mind in bringing the Teleprompter people up at the time.

Q Could we be a bit more specific than that? Did you want to sell games to Teleprompter?

A No. What we had in mind was that possibly, if they recognized TV games as being a valid addition to the CATV environment, that possibly someone could produce games that maybe Teleprompter, since they send a bill out to a subscriber every month anyway, and

therefore have a way of collecting funds, that perhaps one could amortize the cost of that machine, which was placed in a subscriber's home, at some increment to the monthly billing.

That is about as far as the thing went.

Q Now, there was more than one discussion in January of 1968 with Teleprompter, wasn't there?

A That is true.

Q Did you attend all of such discussions?

A Yes. The various discussions were handled by Mr. Etlinger, a corporate director of patents, and myself.

Baer - cross

Q Well, wasn't there a discussion whereby Sanders might build equipment for Teleprompter, to be commercialized in some fashion by Teleprompter?

A If that came up as one suggested way to go as part of a business association between us and Teleprompter, then the answer to that question is probably yes, but this was just one of many questions that were up for grabs. The whole relationship with Teleprompter was one of exploring what we might do together, and it never really got beyond the point where we made several suggestions, worked up an outline for a plan that we might proceed with, and all of that was really directed towards finding out whether playing games in this kind of environment was possible. It was brand new. No one had the slightest idea whether it was a valid concept.

Q Well, wasn't one of the things that was discussed a licensing arrangement with Teleprompter?

A I don't recall specifically whether a licensing arrangement was discussed at this time.

Q Well, the purpose of it was to explore commercialization with Teleprompter, wasn't it?

A Yes.

Q And with Teleprompter in some way being a customer of Sanders Associates, or being a joint venturer, or some-

thing like that?

A More likely a joint venturer, certainly; not a customer.

Q Now, wasn't there a meeting with some other cable television company following the Teleprompter meetings in early 1968?

A Yes, if I recall. You can hardly characterize it as a meeting with another company. Locally in Nashua, New Hampshire, where Sanders is located, there is a cable channel -- cable company, and the individual who ran that company at the time was invited in, to come and see what we had to show in the way of TV games, in an effort to help us think out what we might possibly do with TV games in the context of cable TV. As it turned out, he was singularly unhelpful.

Q And I gather from what you say he was more or less in there as -- just to consult, perhaps?

A That's probably the proper way to describe that.

Q All right, sir, do you have a copy of the 28,507 patent there?

A Yes, sir.

Q Would you turn to Figure 12A?

A Yes.

Q Now, the Flip-Flop 122 is the electronic control of the ball motion, is that correct, sir -- or one of the elements which controls, electronically controls, the motion of the ball?

A Yes.

Q As I look near the reference numerals 119 and 118, I see capacitors near each one of those, reference numerals, is that correct?

A Yes, that's right.

MR. GOLDENBERG: Your Honor, the capacitors are those two spaced lines which extend downwardly in each case. That's the standard symbol for a capacitor.

THE COURT: I see 118, and what's the other one?

MR. GOLDENBERG: 119 is above it. As you come down from the two lines in which those reference numerals appear --

THE COURT: Yes?

MR. GOLDENBERG: -- they come out horizontally --

THE COURT: Yes, I see that, all right.

MR. GOLDENBERG: As you come down from each one of those lines, you see a couple of spaced lines, like a bar.

THE COURT: Right.

MR. GOLDENBERG: And that symbol represents a

capacitor, and so there is a capacitor connected between each of these two lines and ground, is that not correct, Mr. Baer?

THE WITNESS: Yes, it is.

BY MR. GOLDENBERG:

Q What is the purpose of those capacitors?

A The purpose of those capacitors working in conjunction with the resistor, which is immediately to the right of the top junction of that capacitor, that is immediately to the right of 119 and 118 on Figure 12A, is to convert the voltage level at the output of the Flip-Flop to a gradually increasing DC voltage, or a ramp, if you will, which, in turn, has the function of moving the spot vertically in the case of 119, and horizontally in the case of 118.

Q Why are they necessary, sir?

A They are necessary because the logic levels, or steady state voltages, DC voltages, generated by the Flip-Flop 122, if they were applied directly to the ball generator 114, would cause the ball to virtually instantaneously move from one position to another, both vertically and horizontally, without delay.

Q Tell me if you agree with this, sir, that when the Flip-Flop operates, you get an instantaneous change in

Baer - cross

voltage level -- practically instantaneous -- the voltage at one output is operating down here at this one level, and when the Flip-Flop operates, the voltage practically instantaneously jumps up to a higher level; can you agree with that, sir?

A In general.

Q In general. And the effect of that in the ball generator would be to drive the ball across the screen so fast that the eye probably couldn't detect it? It would look like it was here on the left-hand side, all of a sudden, and then, all of a sudden, it's over here on the right-hand side, isn't that correct?

A That's correct.

Q The purpose of the capacitor is to slow down that action, is that correct?

A That's right.

Q Is the ball voltage -- ball control voltage, then, as it comes out of the capacitor, or as a result of the operation of the capacitor, is that a linear voltage, is that a straight line change?

A Well, it's intended to be a straight line change, and, for all intents and purposes, it is a straight line change.

Q But it isn't, though, is it?

A It depends, Mr. Goldenberg. You know as well as I do that --

Q I wish I did. I'm not sure I do.

A -- that this is an RC time constant circuit in which the voltage which is built up across the capacitor to which you referred is exponential with respect to time, but in an exponential curve which looks like this, and the initial 40 or 50 per cent, for all intents and purposes, are a straight line, and that's the part of a curve that used for --

Q Is that spelled out in the patent?

A I don't really know whether it is or it isn't. Besides, I think it's quite immaterial, because a slight change from linearity in that voltage would merely mean a slight change in the speed with which the ball moved across, and you would be very hard put to see that visually.

Q Would there be any change in the path of the

ball?

THE COURT: If what?

BY MR. GOLDENBERG:

Q -- if this voltage were not linear or not in a straight line?

A Oh, certainly.

Q The path of the ball would not be in a straight line, either?

A Yes, but its deviation from linearity, from a straight line function of just how much of a curved portion of this wave form you would be using -- you would use a small part -- you would not be able to detect the deviation from linearity. Since we don't use more than a portion of that waveform, I think it would be very difficult to visually decide that that was not linear motion, effectively linear motion.

Q Well, what, then, is the motion of the ball when you have coincidence in the circuit shown in Figure 12A of this '507 patent? Does it bounce straight back from the paddle? Does it bounce back at an angle, or what?

A Figure 12A shows that the ball motion results from two voltages, the one coming out of 119, and that coming out of 118. The resultant motion is a function of the positions of controls 126, 125, 135 and 134 imme-

diately above the Flip-Flop. You could get all the way from, I guess it's zero motion if you centered those controls to very rapid motions in one direction, or a slow motion in the other direction, both vertically and horizontally, by setting up these four controls in various combinations and permutations.

Q Do you recall offhand what the patent text describes as being the motion?

A Not really, not without referring to the text, Mr. Goldenberg.

Q All right. Now, still looking at that Figure 12A, I notice there are only two knobs for each player, 131 and 127 in one case, and 132 and 128 in the other case; is that correct?

A Yes, sir.

Q What does the knob 131 control?

A Knob 131 controls the vertical position of Paddle A, in this case Spot 1, Paddle A, block 125 on the screen.

Q And what does the knob 127 control?

A It controls the vertical path of the ball after intercept by either -- by the paddle controlled by player A.

Q Is that what you call the english control?

A That's right, sir.

Q Now, sir, the Odyssey 1TL 200 has three knobs for each player, does it not?

A That's right.

Q Would you tell me what figure in this patent 28,507 shows three knobs for each player?

A One of the examples would be Figure 14, although those 2 knobs are combined to a linkage which is called a joy stick handle -- airplane terminology -- so you can control both knobs with the same hand.

Q You understand, sir, I am asking for the figure that shows three knobs for each player.

A I don't believe you will find one in here.

Q So to that extent, the Odyssey 1TL 200 is not described in this patent, the 28,507 patent, isn't that true?

A That's correct.

Q Now, sir, I believe you testified that one of the features of the patent -- Reissue Patent 28,598, was the display of a wall symbol. I believe you called it a fixed hitting symbol, is that correct?

A That's right, sir.

Q And when the ball symbol hit that displayed wall, it would bounce back?

MR. ANDERSON: Your Honor, I don't want to interrupt, but I do believe the witness said

it was a fixed hit symbol.

MR. GOLDENBERG: If I misspoke or misunderstood, let's have it right, by all means.

MR. ANDERSON: Sorry.

MR. GOLDENBERG: No. Thank you. That's a fixed hit symbol.

MR. ANDERSON: I believe that's what the witness said.

MR. GOLDENBERG: Of course.

BY MR. GOLDENBERG:

Q That's a fixed hit symbol then, isn't it?

Is that correct?

A Yes, that's right.

Q And when the ball hit that, it would bounce back?

A Yes.

Q In the earlier patent, Mr. Rusch's patent, 28,507, wasn't there a wall bounce feature?

A Yes, there was.

Q Could you explain what that was?

A It was a bounce of a moving symbol, such as a ball from invisible barriers not on screen.

Q So the only difference between the 28,598 and the 28,507 patents in that respect is that this wall was displayed on the screen?

A Well, that was one difference.

Q In that respect, sir?

A Yes.

Q That's one difference. I appreciate you may feel --

THE COURT: Well, now, I don't know what he means, whether there's one difference in that respect or whether --

BY MR. GOLDENBERG:

Q With respect to the wall and the bouncing off of the wall, the only difference was that in the later patent, the '598 patent, the wall was displayed?

A No, sir. Functionally, that was the only difference, but in terms of the kind of play and play action which we desired, that was an entirely different thing, because you could place that wall anywhere on the screen, or any number of walls anywhere on the screen, and you would get entirely different resulting play action, in addition to the fact that you could see the bounce happening off a wall, but you could not before.

Q You could see the bounce happening off the edge of the screen in the -507 patent, couldn't you?

A Well, in principle, but that depended entirely upon the adjustment of the TV receiver. It's typical of TV receivers to have their raster, that is, the lines, extend past the glass on each side, if you will, and top and bottom, too, for lots of reasons, and --

Q Well, understanding that displaying the wall gave you the opportunity to play different kinds of games, with respect to that feature, that was the only difference, the wall was displayed?

A Yes.

THE COURT: I'm not clear whether it was the same wall, but you just couldn't see it, or whether it was a different wall?

THE WITNESS: Your Honor, if I may respond to that--

THE COURT: Electronically.

THE WITNESS: Yes, electronically, if you will refer to Figure 15B, for example, in -507, I think you will find the answer.

THE COURT: I doubt it!

BY MR. GOLDENBERG:

Q Well, can you do that for the Court?

A That picture and the one below it were intended to show bounce off the edge of the raster, whether it was displayed or visible on the TV set or not. If you reached in back of your TV set and were fortunate enough to have controls, which they have long since eliminated on most TV sets, that allowed you to shrink the raster so all of a sudden the edges were indeed to be visible, and they are now hidden behind that mask up in front, you would indeed see the ball bounce off those edges, or somewhere close to those edges, and that's what's depicted in 15B and 16B.

THE COURT: Well, is the end of the raster controlled by the horizontal sync just as the wall is if you put it out to the middle of the screen?

THE WITNESS: Yes, essentially, that's right.

THE COURT: This might be a good time to take a ten-minute recess.

MR. GOLDENBERG: Thank you.

(There was a brief recess, after which the following further proceedings were had herein:)

THE COURT: Gentlemen, we have checked with the attorneys in that State of Illinois against the City of Milwaukee case, and they have no particular objection to starting late next week. Therefore, it is my plan to finish this case. So it may be best for all concerned if we can keep going until we are finished.

So if you will try to get your pre-trial reset --

MR. GOLDENBERG: I will try, your Honor.

THE COURT: That ought to be fairly easy.

MR. GOLDENBERG: The case is very near settling. We think we can dispose of it.

THE COURT: All right.

BY MR. GOLDENBERG:

Q That Heathkit unit you had, wasn't that a dot-bar generator?

A Yes, it was.

Q What is a dot-bar generator?

A It is a device that puts out lines, patterns, to enable you to adjust the so-called vertical and horizontal linearity adjustments on a TV set so that round circles don't appear to be egg-shaped, obloid, on the TV set.

Q Does it display dots or bars on the screen

of the television receiver?

A Well, bars certainly.

Q Why do they call it a dot-bar?

A With a Heathkit a dot -- yes. It had a switch position that produced dots in a regular geometric pattern.

Q Could you move those dots around?

A No, you could not.

Q Where did they appear on the screen?

A All over the screen, in a geometric pattern.

Q You couldn't move them up or down?

A No.

Q How about the bars?

A No. The bars were simply the spots stretched out. They were fixed.

Q You couldn't control their position?

A No. There was no need to.

Q YOU couldn't even center them on the screen.

A You mean center one of them on the screen?

Q Yes.

A You could, if you reached in back of the TV set and moved the centering adjustment, if there were one.

Q And that was the commercial kit for that purpose?

A That is right.

Q You spoke earlier this afternoon of cathode ray terminals, and Sanders' involvement in that business.

Could you tell the Court what a cathode ray terminal is?

A Well, there are many different kinds, Mr. Goldenberg. The ones that we were mostly concerned with at Sanders in the early years were those that applied to military situations, where the cathode ray tube might fly in an airplane, and it might assist some operator in some function of his job, to see a determination of locations of enemy airplanes in the neighborhood, for example, in a manner in which a radar screen works possibly, or for the transmission of messages, either from the ground up or among the operators in the same airplane, in alpha-numeric symbology on the screen.

Q Well, the kind that would go into an airplane, would there be a symbol displayed or symbols displayed on the screen of that cathode ray tube?

MR. ANDERSON: I object. I don't know what context. Are you referring to what was actually done at Sanders, or are you just speaking generally?

MR. GOLDENBERG: Sanders.

MR. ANDERSON: At what time?

MR. GOLDENBERG: Well, let's say in 1966.

BY THE WITNESS:

A If you want to characterize an alpha-numeric character, a letter or number, as a symbol, then that is a symbol.

BY MR. GOLDENBERG:

Q Let's talk about alpha-numeric displays. An alpha-numeric display displays letters of the alphabet and numbers on the screen of a cathode ray tube, is that correct?

A That's right.

Q This is the kind of thing that one sees out at airline reservation counters, brokerage offices, and that kind of thing, is it not?

A That's right.

Q If I were to go out to O'Hare Airport, there would be an alpha-numeric CRT display, is that correct?

A Correct.

Q Are you familiar with such displays which, in addition to the ability to display alpha-numerics, also displays cursors?

A Oh, yes.

Q Would you tell the Court what a cursor is.

A A cursor in general is a line drawn in some specific direction or some specific length at some angle to the horizontal and vertical.

Q What was their purpose in cathode ray displays?

A To draw pictorials, for example to denote a runway by running two parallel lines on the screen somewhere, perhaps with reference to a compass setting, just to show

whether the runway ran from north to south or east to west, or some such thing, as in a radar display.

Q Well, perhaps my question wasn't clear. If we have a display which is strictly an alpha-numeric display, we are not displaying any other kind of symbol, what would a cursor be in that kind of context?

A In that context a cursor is an index mark, like a pointer, that says "Here is the location in which you are going to enter the next piece of data," like a letter. "Here is where you are going to place your next number, your next letter."

That cursor can take the form of, say, an asterisk or something like that, whatever the designer decides.

Q Could an operator position that cursor horizontally and vertically?

A Certainly.

Q When he positioned the cursor to a location that he wanted it on the screen, he would then make an entry on the screen, as for instance the letter A or B, or whatever it is he wanted, is that correct?

MR. ANDERSON: Your Honor, I also would like to object, or at least inquire about whether this is in some way directed to prior art in this lawsuit.

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If it is, I object to the line of questioning, in that under 35 U.S.C. 282, the defendant was required to give us notice of prior art upon which he was going to rely, and did, and there is nothing that appears to encompass the present line of interrogation.

If it is not an attempt to inquire about prior art, I would object on the ground that it is not within the scope of the direct, and I think it is irrelevant and has no bearing on any issue in the case.

THE COURT: Mr. Goldenberg?

MR. GOLDENBERG: Your Honor, it is concerned with prior art. I feel, however, that the witness on his direct examination, by giving the Court statements as to what he believed to be or not to be in the prior art, gives us the right to inquire into his knowledge, certainly particularly as it affects knowledge with respect to the activities of the plaintiff Sanders Associates themselves.

Now, the purpose of the statute that Mr. Anderson refers to is to avoid surprise, and the Court may receive prior art evidence subject to certain terms and conditions, which the Court may decide, according to that statute.

Here I don't see how there can be any

Baer - cross

claim of surprise, since if I haven't made it clear, it certainly is my intention to limit this line of inquiry, which is almost at an end, with respect to the activities of Sanders and the knowledge of this witness.

MR. ANDERSON: Your Honor, I still believe --

MR. GOLDENBERG: And I would only wind up by saying that we do not rely upon this kind of prior art specifically. The specific prior art items that we do rely on have been identified, will be furnished to the Court, but we do believe it would be helpful to the Court to have a general awareness, if you will, of the state of some portion of the pertinent technology at the time we are interested in.

THE COURT: Overruled.

MR. GOLDENBERG: I don't know whether there is an outstanding question. I believe there is.

Could you read it, please?

(Whereupon the record was read by the reporter as requested.)

BY THE WITNESS:

A That is correct.

BY MR. GOLDENBERG:

Q Now, sir, you testified with respect to Plaintiff's Exhibit 65-197, which is a schematic diagram, and also with respect to the '598 patent and the '507 patent, and you said that one difference between that 65-197 exhibit and the '507 patent and also between the '598 patent and the '507 patent is that the 65-197

and the '598 patent used a digital method, is that correct?

A What I said was that the generation of spot symbols, that is, the paddle symbols and the ball symbols, in the two patents are different, and that we characterized the one, namely the one in Rusch's patent, the '507 reissue -- we designated that as a slicing system because of the manner in which he generated the symbols, whereas we characterized the spot generators in the other patent, in the '598 patent, as digital spot generators.

Q Is there anything in the '598 patent that counts pulses?

A No.

Q In the digital techniques --

THE COURT: I am not sure I understand what is implied by that question, "counts pulses".

MR. GOLDENBERG: Your Honor, I want to avoid making a speech myself, and perhaps I can --

THE COURT: Did you mean there is nothing in the patent which disclosed the fact that the way the pulses were generated is important?

MR. GOLDENBERG: Not quite, your Honor.

There is nothing that -- and, Mr. Baer, listen to this, and if you disagree, so state --

there is nothing in that patent which utilizes electronic circuits for counting pulses produced by a pulse generator in order to perform a certain function, as, for instance, to generate a spot on the screen of the television receiver or determine where that spot should be by using a pulse counting technique.

BY MR. GOLDENBERG:

Q Is that correct, sir?

A Correct.

Q Now, is it not a common understanding that when one uses the word "digital" or "digital techniques", that pulse counting in some fashion is required to be done?

A No. I don't agree with that at all, Mr. Goldenberg.

Q Tell me why not.

A Because it simply is not so. When you use a term "Digital technique", you mean performing functions, electronic functions, to some desired end, with what are commonly known as digital logic elements, flip-flops and the like, and there is absolutely no definition that I am aware of that includes the counting of a pulse frame as a necessary prerequisite to characterize the circuit as a digital circuit.

Q I understand that, sir. But can you agree with me that in the 598 patent a single pulse, if we are looking at the horizontal scan, represents a movement completely from the left-hand side to the right-hand side of the screen? Is that correct?

A I don't understand.

Q Looking at the horizontal synchronizing pulse --

A The horizontal synchronizing pulse, two successive horizontal synchronizing pulses define the interval from which the beam sweeps from left to right. That I will agree to.

Q Now, in order to determine where a spot is going to be displayed on that horizontal line or the beginning of a spot is going to be displayed, is there anything there which divides that horizontal line up into a number of segments and then counts segments of that horizontal line?

A There are no segments to the horizontal line.

Q I'm sorry?

A There are no segments to a horizontal line in a TV sweep. It is a continuous line, swept out from left to right.

Q When the line is on, there are no segments to it, are there, and when you are displaying the full horizontal line, it is a continuous line, isn't it?

Baer - cross

A Certainly.

Q But isn't it possible to provide electrical circuits which divide that horizontal line up into a number of smaller increments?

A Certainly. I have built those myself.

Q When did you do that, sir?

A As far back as 1948, when I worked at American Television Labs, here in Chicago. We built television synchronization generators in which the vertical synchronization process was obtained by taking a crystal oscillator, running it several megacycles, dividing it down to 1575, the horizontal pulse rates, and then dividing it down somewhat further to 60 cycles to get the vertical line rate. That is a common method for generating precise pulses, accurately controlled in terms of time by using a crystal standard.

Q All right, sir, so that's a comonly done technique?

A That's right.

Q Now, isn't it possible to cause something to be displayed at a certain point on a horizontal line, cathode ray tube television receiver, by providing an electrical circuit that divides that line in some fashion into a number of discrete segments, and instructs the electrical circuitry to begin displaying when you have counted up to 15 segments or 25 segments along the length of that line?

A Yes, except that --

Q Would you call that a digital technique?

A Yes.

Q Is there anything like that in the '598 patent?

A No, there isn't, for some very obvious reasons. We were constructing a \$19.95 device, not a \$2,000 device that could contain a bill of materials of \$200.

Q You never sold -- I'm sorry, go ahead.

A Since it's to the point, if I may, I just want to give my impression of the background of this question.

A television set requires that horizontal and vertical sync pulses come in at a certain rate, and that that rate be within certain tolerances. If

you deviate too much from the tolerance, you have got the phenomenon which you often have in your TV set where the picture starts to rolling, of loss of synchronization. It was of great concern to us in building the initial TV games to be able to put out the horizontal and the vertical sync pulses at rates within the tolerances that a normal TV set could follow, so it wouldn't flip over and require stepping over to the TV set and touching up the controls.

Commonly, how that kind of thing is done is to build pulse generators very accurate in terms of their pulse repetition interval.

One other -- a common way of doing that, in turn, is to do what Mr. Goldenberg just described, namely, to use a counter to count from some stable reference source, exactly the same thing that is done on digital sources, count from a crystal frequency source to some lower frequency by a process called binary division, digital division, which retains the initial accuracy of the basic frequency source, namely, the crystal.

That's a lovely way to do things. It's exactly the way it is done in many, many devices. But it's not done in a device that is intended, at least in the 1966, 1967, 1968 environment, to show

up in the marketplace for 19.95 or 29.95, to delineate the area which couldn't have a component cost of more than \$10.00 total, because the components required to do that division process alone would have been of that order of magnitude, if not more, apart from the fact that it would have required integrated circuits that we couldn't afford, because in those days they took so much power, you couldn't operate them from a battery.

So, all this by way of saying why you won't find a frequency counter in our early television games. There's a good, sound, basic, simple engineering reason for it.

Q And you won't find it in the patents in suit, either, will you?

A That's correct.

Q That's the way it's done by Seeburg in its coin games, isn't it?

A That's correct.

THE COURT: You mean by the frequency counter method?

MR. GOLDENBERG: Yes.

BY THE WITNESS:

A Yes.

BY MR. GOLDENBERG:

Q With respect to this matter of the ball or

hit spot being continuously moving -- and you may want to look at the patent claims in connection with this -- but is there anything in the patent claims of either the '507 or the '598 which requires that the ball be continuously moving?

MR. ANDERSON: Your Honor, I object to asking this witness to interpret the claims. I think that belongs in Mr. Goldenberg's brief.

THE COURT: I will let him answer only if he is equipped to do so on the basis of his familiarity with the claims. I don't consider that this witness was tendered as an expert on what the claims say.

MR. GOLDENBERG: I understand that, your Honor, and Mr. Baer should understand, and I ask the Court to understand, that I put the question to him not as a patent expert at all, sir, but --

THE COURT: Well, even as a matter of interpretation of the claim language, I wouldn't feel that the defendant -- wouldn't feel that the plaintiff was bound by any answer that he gave on that.

MR. GOLDENBERG: All right, I withdraw the question.

THE COURT: All right.

BY MR.GOLDENBERG:

Q Do you have a copy of Plaintiff's Exhibit 64-261, sir?

A Would you mind holding that up so I can see it?

Yes, I do.

Q Mr. Baer, as I understand your testimony about this exhibit, the horizontal sync signal is derived from the horizontal output transformer of the television receiver, is that correct?

A In this case, yes.

Q That's all I'm talking about, sir, is this case.

A Yes.

Q Where does the vertical sync signal come from?

A Somewhere within the vertical deflection circle.

It's not specifically listed here. I gather it came from the vertical deflection output transformer. It entered the schematic just below the one noting the horizontal sync input next to the 51 ohm resistor.

Q The drawing doesn't indicate where that signal comes from, does it?

A No.

Q And when you say it comes from the vertical output transformer, are you talking about some device that you built, or are you talking about either of the patents in suit?

A No, I am talking about that component in a TV set with which this TV breadboard was in intimate association, was wired into.

Q Now, based on your familiarity with the games of the defendant Seeburg, do you know whether or not they got their horizontal and vertical sync signals from the output transformers of some television receiver or not?

A Yes, I know the answer.

Q I'm sorry?

Baer - cross  
- redirect

A They did not.

Q They did not. So they didn't do it the way that's shown or suggested in this drawing here, did they?

A No, they did not.

MR. GOLDENBERG: Your Honor, I think I am just about done, if I may consult with my associate for just a moment.

THE COURT: All right.

MR. GOLDENBERG: Your Honor, that completes our cross examination of this witness.

THE COURT: Very well.

Redirect?

MR. ANDERSON: Yes, your Honor.

#### REDIRECT EXAMINATION

BY MR. ANDERSON:

Q Mr. Baer, if you will, refer to your -480 patent, that is, patent 3,728,480. Do you have a copy of that? I think Mr. Goldenberg gave you one.

A Yes, I do.

Q Now, Mr. Goldenberg has asked you certain questions about the 1967 demonstration for Mr. Etlinger and others, and the relationship of that demonstration to the disclosure of your -480 patent.

I would like you to look through the

drawings of the -480 patent and state if, to the best of your present knowledge, the significant work that you had done up to about the filing date of the -480 application, which was January 15, 1968, is disclosed in this patent?

In other words, is the patent a disclosure of the work which you personally had done on TV games other than the work which you did with Mr. Rusch and Mr. Harrison on the subject matter of their two patents?

THE COURT: Mr. Anderson, I'm afraid I lost the trend of that question. Would you mind repeating it?

MR. ANDERSON: Certainly, your Honor. I'm sorry.

BY MR. ANDERSON:

Q Mr. Baer, I would like you to look through the -480 patent, and state whether the -480 patent incorporates the subject matter of your demonstration to Mr. Etlinger, et al., in the summer of 1967, if you know?

THE COURT: While he is looking, where do you find that date that you referred to as the filing date?

MR. ANDERSON: It's on the first page, your Honor, under line 63, continuation of serial No. 697,798, January 15, 1968, abandoned. This application was first filed on January 15, 1968, and then during the course of --

Baer - redirect

THE COURT: You are referring to -480?

MR. ANDERSON: -480 on the first page, the left-hand column, under "Related U.S. application data."

THE COURT: Oh, yes, all right.

MR. ANDERSON: The -480 --

THE COURT: Oh, I see, continuation of another one, January 15, '68, I see.

MR. ANDERSON: Right, and it was an identical disclosure that was refilled in accordance with Patent Office practice, on March 22, 1971.

THE COURT: All right.

MR. ANDERSON: The original filing date was January 15, 1968.

THE COURT: I see.

BY MR. ANDERSON:

Q Mr. Baer, do you recall the question, or would you like --

A Yes, I recall the question. The answer is that all of the elements in the game which we demonstrated to Ettlinger and Campman in June of '67 are contained in this patent -- or in the figures of this patent, to the best of my recollection.

Q Now, I would like you to look through the patent and state, if you can presently recall, whether there is work that you did after the demonstration in the summer of 1967 and before the filing date of January 15, 1968, is there any work that was done in that period that is reflected in the application and specification of U.S. Patent 3,728,480?

A Yes, sir, there is.

Q Can you state with any specificity what portions fall in that category?

A Well, especially those that relate to Figures 6, 7 -- 7, rather, 8, 9 and 10, which have to do with a way of producing television games that has not been discussed here before at all.

MR. GOLDENBERG: Excuse me, could I ask Mr. Baer to speak up a little bit? I'm having --

THE WITNESS: I'm sorry, I'm too far.

What I said, sir, is that Figures 7, 8, 9 and 10 refer to ways of playing games on a television set that we have not at all discussed here before, and are really quite different from those which we had heretofore talked about.

BY MR. ANDERSON:

Q Now, the subject matter of the Rusch patent 28,507, is different from the subject matter of your patent '480, is it not?

A Yes, sir.

Q Well, can you characterize the important differences that -- the most important differences that you see in the patent '507 over the patent '480 that show that the subject matter of the '480 patent fails to anticipate the invention of the '507 patent?

MR. GOLDENBERG: Your Honor --

THE COURT: I was just thinking in my own mind he just waived any objection on that, so on recross this is fair game.

MR. GOLDENBERG: Thank you.

THE COURT: Go ahead, Mr. Baer.

BY THE WITNESS:

A The -- I'm sorry -- the primary difference between by '480 patent and Rusch's '284 patent, or Reissue 28,507, is in the addition of the interactive

ball spot, the ability to play interactive ball games.

BY MR. ANDERSON:

Q When you say "interactive ball spot", would you go into a little more detail on what you mean by an interactive ball spot and the ability to play interactive ball games?

A I mean the generation and display of what the patent calls the hit spot or the hit symbol, namely, that symbol which denotes a ball in the ball game, and which is moved between symbols that might denote the paddles in a particular game, as intercepted by the paddles, and has its path, horizontal path, reversed after intercept, and, in general, has its path controlled by a number of inputs, some machine-generated and some human participant-generated.

Q Now, Mr. Goldenberg asked you about the use of a gun in a target game in your '480 patent, and used the term "coincidence." I think there may be some doubt about what coincidences refer to, and would you explain specifically how the target game functions in your '480 patent?

A Yes, I will. The target game functions by pointing a toy rifle, and imaging the spot of a TV symbol through a -- on the face of a photosensitive device, such as a photoresistor device, which is lined

up physically or optically with that spot on the TV set, and at the same time depressing a trigger which then caused the switch to close or open, denoting that at the moment at which the photosensitive cell had imaged, picked up the spot on the distant TV set, it had also received an impulse, a signal, from the trigger switch, and that, as a result of this coincidence between a -- in terms of time -- between a switch depression and the imaging of that spot, the game logic was told that such a coincidence had indeed occurred, and something was caused to happen, in this case the disappearance of the target spot.

Q Was there any coincidence between two spots on the screen that were utilized in the target game of the '480 patent?

A No, sir, there was not, and that is why in response to Mr. Goldenberg's earlier question I said if he considers that a form of coincidence in the context of coincidence that we talked about earlier here, mainly the coincidence of two spots being on the screen simultaneously, that was all right with me, it was a different kind of coincidence.

Q Now you answered some questions about utilizing a counter to count the horizontal line, and you were asked if you were familiar with the Seeburg circuit in that respect.

In the Seeburg use of circuitry in conjunction with a TV display, is there some sort of counter that causes the line to step across the screen, or how is the line generated in the Seeburg game, if you know?

A By line, you mean a line segment of --

Q A line on a screen, the thing you see when you are watching the game.

A No, sir. Certainly not. The line generated on the screen is generated by the deflection of a cathode ray tube beam in the cathode ray tube. It is always there. It doesn't matter what you display on it. It

is there.

Q And that is true in the Seeburg games that you are familiar with?

A Yes, sir.

Q So the Seeburg TV display is a continuous sweeping line, just as it is in the games that you developed?

A Yes, sir. It would have to be.

Q Then is the line being pulsed or interrupted in any way that in anyway breaks it up into segments?

In other words, I don't understand how there are any segments on that TV display.

A I think segments is a misnomer. What was intended here, and I believe I can speak for Mr. Goldenberg, was a succession of time intervals, segments in time, but certainly not in segments of the line, because a line is a continuous line.

Q And in the Seeburg game, once the segments of time have been determined by the circuit, how is that segment of time used to develop a spot on the TV screen?

A It is used to unblank the spot during that time as it is traveling across the screen, so as to paint a short line segment, just as we do in our spot generators.

Q And is that unblanking, then, which you say

is done as it is done in the spot generators, in any sense any more digital than the unblanking of your spot generator, as far as the sweep is concerned?

A Well, no. Not if you are dealing strictly in black and white levels, which we normally are. The unblanked signal which causes the beam to come on is a steeply rising signal that causes the beam to go white from being black before. So in that sense it is just as digital whether I generated it one way or another.

Q Mr. Goldenberg asked you some questions about a demonstration for Teleprompter, and I think you said that that was in the nature of a breadboard.

Was that particular circuit that was on the breadboard that you demonstrated for Teleprompter ever actually refined into a package that was commercial and marketed by anybody?

A No, sir, it was not.

Q What became of that breadboard which you demonstrated to Teleprompter then in its development genealogy?

A Well, it remained the breadboard which we have here in court. It was discarded, and we went on to other breadboards which did not concern themselves with a display of TV games in connection and coopera-

tion with a cable signal.

Q You were asked several questions about a man named Gassler and his proposals for cathode ray tube displays and various other alpha-numeric cathode ray tube displays.

Did you know any TV type display in 1967 on which games were played or could have been played by any available equipment that existed at that time?

A No, sir.

Q You also were asked some questions about the fact that the various circuits of the '507 and the '598 patents show only two knobs, and you explained what some of the two knobs are functionally, while the Odyssey game has three knobs.

Exactly what are the functions of the three knobs in Odyssey as they relate to the patents?

Are the three knobs functionally disclosed in the patents, or not?

MR. GOLDENBERG: Your Honor, excuse me. I object to the form of that question. It is a little confusing, first of all. There is a premise in it that these three knobs relate to the patent, and the witness has testified that the three knobs are not in the patent. So there is a premise to the question that is improper.

Then it goes ahead, and says let's follow it up by really a separate question.

THE COURT: I think I will sustain the objection.

Why don't you just ask him what the relationship, if any, is between the two knobs?

MR. ANDERSON: I certainly will. Perhaps, because of the way I understood the cross examination, I made it unduly complex.

BY MR. ANDERSON:

Q Mr. Baer, you were asked on cross examination about the three knobs in the Odyssey game, and in the final demonstration unit that we have demonstrated to the Court.

What are the functions of those three knobs?

A Those knobs function, No. 1, to position the paddle vertically, and, No. 2, to position the paddle horizontally, and, No. 3, to determine the path in a vertical direction of the ball spot after intercept by the paddle of the particular player who last intercepted the ball.

Q Now, are those three functions that you just described of the three knobs set forth in the Reissue Patent 28,507?

A Yes, they are.

Q Can you point out some figure or place where each of those appears?

A Certainly. If you go to Fig. 12A and look at the elements numbered 126, 125, 135 and 134, the potentiometers between the diodes above the block called Flip-Flop, block 122, you see that two of those elements through a dotted, or dashed lines, rather, are tied to knobs 127 and 128, and two of them are not. Those other two knobs in the Odyssey implementation and any implementation of Exhibit 62,

Baer - redirect

the brown box, perform the same function of guiding the -- I am sorry. That is incorrect. Those two controls, 135 and 134, which are shown here -- no. I am beginning to mislead you. I am sorry. Just ignore what I said.

The spot generators in Fig. 12A and 12B do not indicate an additional input for horizontal positioning such as that used in Odyssey.

Q Horizontal positioning of what in this case?

A Of the two paddles. However, those are shown in -480.

Q Are they in -507 anywhere? Is there any disclosure in -507 of horizontal positioning of spots?

A Of the paddle spots?

Q The player control spots. The paddle or player control spots, other than the ball.

A Yes. I refer to others. When we refer to the joy stick in Fig. 14, and Fig 13, and again in Figs. 17A and 16A, in which both horizontal and vertical spots exist, though they are not brought out to separate knobs.

Q So the three functions of the three knobs in Odyssey are disclosed in the reissue patent '507?

A They certainly are.

Q I would like to ask you the same question --

THE COURT: May I ask a question here that I'm sure betrays my ignorance as to what the issues are?

Are we concerned here with Odyssey, or are we concerned with the '507 and '598 patents, whether or not the defendants' device infringes those patents?

In other words, what differences does it make whether Odyssey embodies either of the plaintiff's patents?

MR. ANDERSON: Your Honor, first of all, the questions were in response to the cost.

THE COURT: I understand. And this didn't dawn on me so much during the cross, but it is dawning on me now.

MR. ANDERSON: I think the answer to your question is that the '507 and '598 patents are the patents in suit, and it is our burden to prove that they read upon the accused products.

However, we have put in the Odyssey story because we think it is very important to show

the merging character of the work and the commercial success of the inventions.

For that purpose, we do put them forward.

MR. GOLDENBERG: I don't know whether you want to hear from me, your Honor.

THE COURT: I would like to hear from you, Mr. Goldenberg.

MR. GOLDENBERG: You may recall this relationship between the Odyssey and the patents in suit really came up in the direct examination.

THE COURT: Yes. That is true, too.

MR. GOLDENBERG: And I think that part of plaintiff's argument here is of course the commercial success argument which we talked about the first day of trial. We told you that we had stipulated with respect to the dollar value of the sales and a number of units, and so forth, up to a certain period of time.

So there is not going to be any issue on that.

But we did say that we did believe there was an issue as to whether or not these Odyssey games practiced the invention of the patent, followed the teaching of the patent,

whether that commercial success could be attributed to the inventions of the patent in suit.

So there is an issue there.

There may be a commercial success, but it would be our position that there would not be because of the merits, the alleged merits, of these patents that we are talking about here.

THE COURT: If it turned out that the Odyssey game, for instance, embodied, as an indispensable part of it, the plaintiff's invention, but then went on to add some embellishments, then I suppose it would be up to the Court to determine what part of the commercial success was due to the basic invention and what part was due to the embellishments and make a discount on that basis.

MR. GOLDENBERG: Precisely, your Honor.

For instance, that the '480, the first patent application we filed, is in issue there. That may be an invention, the commercial success may be attributed to the invention of the '480 patent. So it could be something that came earlier or something that came later than the patents in suit, which could have resulted in that commercial success.

THE COURT: All right. Thank you.

BY MR. ANDERSON:

Q Mr. Baer, would you please refer to the second patent in suit, Reissue 28,598, and if the three functions of the three knobs in Odyssey are disclosed in any of the figures or descriptions, please point out at least one place where each of those functions is disclosed.

A To begin with, in Fig. 1, Fig. 1A there are shown control boxes which have two pairs of knobs, and I think if you will refer to the text, it will tell you in the text that those knobs are horizontal and vertical position controls for the spots shown in the pictorial in Fig. 1

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- recross

Q Yes. That is a column 4, line 29 of the patent.

Is that what you are referring to?

A I just assumed it was there in a number of places.  
I will check that.

That's right, sir.

Q Is the rebound control or so-called English control also shown as a knob in some of these figures?

A Yes, it is. For example, in Fig. 12A the two knobs labeled 111 and 112 are English controls.

Q Now, with respect to the demonstration that you made to Mr. Etlinger and others in June of 1967, was there anyone outside of Sanders Associates, any outsiders, who observed that demonstration, or were they Sanders people?

A Both Mr. Etlinger and Mr. Campman were Sanders people. They were the only ones present besides Harrison and myself and possibly Rusch.

MR. ANDERSON: I think that completes the redirect examination.

THE COURT: Mr. Goldenberg?

#### RECROSS EXAMINATION

BY MR. GOLDENBERG:

Q Mr. Baer, just so we have this quite clear, in the June 1967 demonstration and in the '480 patent there was coincidence, was there not, in a chase game?

A Yes, there was.

Q I think you already have done this, but I think it is a little confused, and I would appreciate it if you could briefly describe that chase game again and how the coincidence worked in that game.

A Yes, sir. In that game two participants moved the two available spots on the screen via two sets of controls. Each of the participants had a horizontal and vertical positioning control available to him, which he used to move his spot about the screen.

The rules were that one spot was to chase another or one participant was to chase the spot of another in an attempt to catch up with it. When this catching up took place, that is, when the spots were partially overlapping on the screen, which was our definition for coincidence and therefore the signals that generate those spots are coincident in time, in real time, a coincidence signal would be generated, and it would do something. In this case we chose that something to be the disappearance of the chase spot. It went away. It disappeared.

Q There was an electrical circuit to detect that coincidence?

A That's right.

Q Now, with respect to the Teleprompter demonstration

in January of 1968, the breadboard was discarded?  
I believe that is your testimony. Or perhaps not discarded, but nothing was ever done. It is here in the courtroom today, isn't it?

A Right.

Q It was never used again for any other purpose?

A That's right.

Q Except for demonstrations?

A No, sir.

Q That was the only time it was ever demonstrated?

A That's right.

Q The game and circuit concept which that breadboard represented, were they cast aside?

A No, they were not.

Q They constituted the subject matter of the application, the patent application, which ultimately became Reissue -507 patent, isn't that true?

A That's right.

Q Now, I believe that in response to a question to Mr. Anderson you testified that the important difference between the invention of the -507 Reissue and your -480 patent was the interactive ball games, is that correct?

A The introduction of a third symbol which had the characteristic of interacting with other symbols on the

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screen in the fashion of the ball.

Q What is the basis of your answer there?

A Excuse me?

Q By that I mean have you studied that patent, sir?

A At various times, certainly.

Q And you consider yourself to be familiar with it?

A I think so.

Q Have you ever had any discussions with anyone as to what that invention of that patent is?

A Well, I certainly have had discussions of that type over the years that this whole issue has been alive.

Q You had discussions with Mr. Etlinger?

A Certainly.

Q Who is Mr. Etlinger?

A Our corporate director of patents.

Q Mr. Seligman?

A Yes.

Q Who is Mr. Seligman?

A Mr. Seligman is a patent attorney who works in Mr. Etlinger's office.

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Q Mr. Anderson?

A Probably.

Q Have any of those gentlemen disagreed with your understanding of that patent?

MR. ANDERSON: Object, your Honor. I think that --

MR. GOLDENBERG: Your Honor --

THE COURT: I think that might be into the question of lawyer-client privilege, to some extent, and I think I would sustain that objection.

MR. GOLDENBERG: All right.

THE COURT: I think I will overrule it as to Mr. Etlinger, however.

MR. ANDERSON: He is an attorney at law, your Honor.

THE COURT: He is?

MR. ANDERSON: Yes.

THE COURT: Well, he is house counsel. I feel a little differently about house counsel. Maybe I shouldn't --

MR. GOLDENBERG: All I'm trying to do here, your Honor, is to shorten this, to demonstrate to the Court, to the extent that I can, that Mr. Baer does have a view, that that view has come as a result of his understanding and talking with conversant people,

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if you will.

THE COURT: I have an idea that the input might have run the opposite direction. In any event, I get your point, so --

THE WITNESS: Thank you very much.

THE COURT: Not meaning any deprecatory implications as far as Mr. Anderson is concerned.

MR. ANDERSON: Thank you, your Honor. I accept it for --

MR. GOLDENBERG: My sole purpose was to shorten this, and perhaps if you give me a moment to think, I can find a better way to do it and avoid this problem area.

BY MR. GOLDENBERG:

Q In any case, sir, you have studied that patent and have expressed your views about it, as to what its invention was, to Mr. Seligman, Mr. Etlinger, Mr. Anderson, is that correct?

A Yes, sir.

Q All right, sir, can you tell me what the difference is between the Reissue -598 patent and your -480 patent?

A The -598 patent, which is the Reissue of the -284 Rusch patent --

MR. ANDERSON: Let me correct that.

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MR. GOLDENBERG: Yes, of course.

MR. ANDERSON: The -598 is the reissue of the -285 three-inventor patent.

BY THE WITNESS:

A The difference between the basic patent and the Reissue patent was the addition of references to --

THE COURT: Excuse me, now, before you go any further, which two numbers are we talking about here, -598 and -480?

BY MR. GOLDENBERG:

Q Do you understand that, sir, that I am inquiring about the differences between the -598 and your -480 patent?

A Well, I was attempting --

THE COURT: -598 is not a reissue of -480.

BY MR. GOLDENBERG:

Q Is that what you are confused on, sir?

A No, it is not. The point is I didn't think I could answer that question without recalling that -- the difference between the -480 and the Reissue, the same difference as that between the -480 in the basic patent on which the Reissue was based, with the exception of the appendages that appeared -- changes that appeared in the Reissue, so that I guess I don't understand the question.

Q Well, perhaps -- you understand, sir, the -598

Reissue patent is a reissue of the --

A -285.

Q -- -285 patent in which you are co-inventor?

A Right.

Q Now, my question to you is what are the differences between the invention of the Reissue -598 and your -480 patent?

A Well, as I said earlier, in the main, the difference between that patent and the -480 is the interactive gaming in the presence of a fixed hit symbol, like a wall.

Q Which is displayed on the surface of the TV screen?

A TV screen.

Q Well, would it be correct, then, that the only difference between -598 and the -507 Reissue patents is the display of the wall?

A Well, offhand, I don't know whether that's the only difference, but it's a significant difference between the two.

Q What other differences can you think of, sir?

A Well I'm afraid I would have to search through the patents to come up with the answer, Mr. Goldenberg.

MR. ANDERSON: Mr. Goldenberg, do you mean circuit-wise, because we have had an awful lot of

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testimony on the differences?

MR. GOLDENBERG: Thank you, Mr. Anderson. I mean differences in the invention.

BY THE WITNESS:

A In the interim, several other thoughts came.

First of all, there is this basic difference of the wall fixed hit symbol in -598 vis-a-vis the lack of that symbology in -507, and, secondly, there are a number of different ways in which that wall is implemented. For example, it's a full length wall on the left-hand side of the screen in a handball game, but the -598 also shows its use as a halfway wall in the center of the screen in a volleyball game, and I don't think -- there are still other variations -- but that's another way in which new elements were developed in -598 that weren't present in the -507.

Q All right, sir.

A There may be others. I don't recall right now.

Q Well, it's important, and I know it's the end of the day, near the end of the day, and you have had a long day, but I would ask you to take a moment and give us the best answer that you can.

A All right, sir.

Certainly, I have forgotten the most

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important element, the difference we have referred to at least a half-dozen times today, in the nature of the spot generators, the symbol generators, the type of circuitry employed in -598 versus that shown in -507, namely, the slicer circuits shown by Rusch in his patent which was reissued as -507 versus what we call the digital circuits in -598.

Q Why is that important?

A It's important because it bears on the practicality, and, therefore, the eventual salability of the product. I think I mentioned earlier that we were very concerned about a number of things, among them the stability and producibility of circuits that we had designed early on, and the difficulties we had had with Rusch's slicer circuits with respect to temperature and time, that is, that the drift -- that is, the inability of a spot to stand still for very long in a spot, in one place, because of temperature changes, component value changes -- the circuits in -598 were specifically designed to eliminate those problems, and they do so by using saturated circuitry. That's why we call these circuits digital circuits, because they basically produce an output that goes from rail to rail, or from zero to maximum, which is typical of a logic signal or digital signal, and, therefore, there

can be no question of voltage drift in the sense that we had problems with voltage drift in the Rusch design of -507.

And there are lots of other reasons along that same line, Mr. Goldenberg, why the change in circuitry was important.

Q Well, what I understand therefore, sir, that the circuitry of the '507 patent has never been incorporated in any commercial product that you know of?

A The specific circuits relating to the spot generation, the slicer circuits, were not incorporated in any commercial device, that's correct.

Q Can you answer my question yes or no, sir? I would appreciate that.

A Yes.

Q Thank you.

Now, in the '598 patent, to avoid that, you went to what you call the digital circuitry?

A Yes.

Q Now, the basic unit there, circuit unit in that patent, is a square wave generator, is that correct?

A If you are referring to Figures 7A, Mr. Goldenberg, then you are correct in the sense that the output stages shown in that schematic produce logic level output signals.

Q Well, sir, didn't the dot generators of the '480 patent use square wave generators also?

A Yes, they did.

Q So you just went back to what you first started to use, didn't you?

A No, these are different.

Q Different kinds of circuits, but the principle is the same, still square wave generators?

A Yes, they are.

MR. GOLDENBERG: Thank you, sir, I have no further questions.

REDIRECT EXAMINATION

BY MR. ANDERSON:

Q Mr. Baer, how did the generators of your '480 patent differ from the generators that are shown in the '598 patent in a few of the bare essentials?

A Circuits in the '480 patent used a change in resistance in an element in the base circuit of the first of the two consecutive transistor stages to effect the change in delay which eventually results in a change of position on the screen of the symbol, whereas in the circuitry in '598, we came up with an entirely different scheme using a voltage control which affected back biasing of a diode to which a horizontal sync pulse was directed, and getting a time -- effective time delay through this combination of elements.

I would say that the similarity between the two circuits is strictly superficial.

Q And functionally were there advantages or differences in the operation of the generator in the '598 patent and the one that's in your demonstration unit, as compared to the disclosure of your '480 patent?

A Yes, very much so.

Q And can you describe those just briefly?

A I'm sorry. Very much so.

Since we needed voltage control for the ball spot, to move the ball about the screen under the influence of some changing voltages, either generated by the machine or by human intervention, we had to develop that kind of a circuit in the first place, and then it became obvious that we could do exactly the same thing for the manually controlled paddles, and that's what reflected in these schematics here.

Q All right, with respect to the demonstration unit that you testified about that was used at the Teleprompter demonstration at your plant, after you completed that demonstration, I understand that you laid that unit aside. Was there continuing development of TV games at Sanders after the date of that demonstration?

A Yes, sir.

Q And who was involved in that after the date of that demonstration up until the time that you completed the demonstration unit?

A Well, again, myself and Rusch and Harrision, with occasional participation by people like Etlinger.

Q Were there changes and evolutions in the circuit and development after the date of that demonstration?

A Yes, certainly. I think partly as a result of a lack of response from Teleprompter, we discarded the whole idea of working in a CATV environment and went back to the initial concept of building a discrete box that stands alone and can be attached to any broadcast television receiver, and then proceeded -- I laid down, as you will find in the records somewhere, what that next machine was supposed to be, and defined it, and Harrison and probably Rusch also, went to work and physically built the machine under my daily supervision, and as a result of that, we came to the next box genealogy, which we traced today.

MR. ANDERSON: Thank you. No further redirect, your Honor.

MR. GOLDENBERG: We have no questions, your Honor.

THE COURT: Let me just ask one question. This digital circuitry, Mr. Baer, is it your belief that you invented that type of circuitry, or that your invention lies -- and when I say

"you", I mean your group, -- your invention lies in the use of that already known type of circuitry in this particular kind of device?

THE WITNESS: If I may, sir, with respect to --

THE COURT: If my question isn't any good, go ahead and rephrase it.

THE WITNESS: Well, I will have to try it this way: With respect to the spot generators and the ball generators which are used in 62, which are used in Odyssey, the circuitry evolved -- well, no circuitry stands or is unique in its entirety, because it's based on whatever an engineer knows or can find in techniques, but this is quite unique, and it really -- and we are damm proud of that circuit -- it does, with two transformers, what everybody needed four to do, so, in that sense, it certainly was created for the purpose, and serves very efficiently to fulfill the functions required in that circuit in a unique way that had never been done before.

THE COURT: Would you say that knowing what the problem was, that the use of that particular type of circuitry would have been obvious to anyone skilled in that art?

THE WITNESS: No, it wasn't even obvious to us, sir, in the first -- in the '480 related hardware, or in Rusch's hardware. It was something we generated in the middle of '67 as a result of our desire to come up with a simple circuit that obviated some of the negative qualities of Rusch's circuitry, and didn't require too many parts, and if you ask any competent engineer how many parts it takes to build both a delayed and a fixed pulse, he would tell you a minimum, if done with discrete -- a minimum of four transistors, and that's how it's been done consistently since days of vacuum tubes, and we came up with a circuit with two. It retains voltage control, which was essential to us, and did it very well. So we thought of this as a very clever circuit.

In addition to that, it gave us a very nice square rectangular output signal which was not a characteristic of Rusch's circuitry, so that a nice sharp symbol occurred on the screen.

THE COURT: All right, anybody want to ask

any more on that subject?

MR. GOLDENBERG: No, your Honor.

THE COURT: All right --

MR. ANDERSON: Your Honor, I might just ask one or two questions along that line.

THE COURT: Yes, go ahead.

FURTHER REDIRECT EXAMINATION

BY MR. ANDERSON:

Q Mr. Baer, as I understood, your testimony, the circuit that you developed did, in two transistors, what could have been done in four transistors in other circuitry, is that correct?

A Yes, or if --

Q And then did you consider the use of the two-transistor circuit basic to what you were doing, or was there something else that you were doing in this development program that was the goal of the group?

A Well, certainly, that wasn't --

MR. GOLDENBERG: Your Honor, it seems to me, in the context of the situation in which we find ourselves, that question is --

THE COURT: In which I have immersed you, I suppose, by my inquiry.

MR. GOLDENBERG: I think asking a question at this time where --

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THE COURT: You are objecting to the leading?

MR. GOLDENBERG: To the leading nature of it.

MR. ANDERSON: I'm sorry.

THE COURT: I will sustain that objection.

MR. ANDERSON: I will try to rephrase it.

BY MR. ANDERSON:

Q Mr. Baer, now, you have testified about the two-transistor circuit that was incorporated into the demonstration unit that finally resulted in Exhibit 62. Were there other circuits known to you at that time that could have been used in the overall game equipment at the time that you put the two-transistor circuit in?

A Certainly, dozens of them.

Q Now, can you explain, then, the relationship between that two-transistor circuit and the overall project that you were involved in?

A- Yes, certainly. I think the significant objective here was to produce a piece of equipment which, as I said earlier, would hopefully find its place in the home, in the consumers' hands, at a price that seemed reasonable to me, at least, at the time, back in '66, '67 and '68 and we talked about 19.95 or 29.95 types of equipment.

In that context, to minimize the parts count, and to use cheap, inexpensive parts, it was

absolutely mandatory, and for that reason the whole design approach to the development of a TV game was confined to certain limited areas. There are certain things that we could not do. For example, like we said earlier, the use of integrated circuits, which is almost a natural way to build equipment today, was investigated. In fact, I think you will find in one of Harrison's notebooks this specific reference on several days where somewhere in the development of one of the units we decided we ought to really take a hard look at the use of integrated circuits, and we did, and we found that with those integrated circuits available back in '67, from both a price point of view and the power consumption point of view, a battery-operated device that was suitable for consumer's use at those prices was simply unobtainable, so we walked away from the use of integrated circuits, all this in the context of your question, does this design -- was this design related to the end product. The answer is every step of the way, when you make a design, it's related to the end product. You have always got to keep the price in mind, which means the way you structure the circuitry, the way it's connected, all those factors, which you never lose sight of, or you may build a monstrosity you can't sell.

Q Other than the constraints which you placed upon yourselves with respect to price, were there any other reasons why you could not have used more complex circuits, or integrated circuits, to wire up the games which you were developing at that time at Sanders?

A Yes, Mr. Anderson. I already suggested one of them. The other one was power consumption. In '67, the available integrated circuit logic lines were in a form called diatransistor logic, DTL, resistance -- a resistance transistor logic form of circuitry which was somewhat less of a power problem, but both of them consumed such copious quantities of power that by the time you assembled logic out of those components, a reasonable power budget was unachievable in terms of dry battery, dry cell.

Q And other than power and cost, functionally, was there any impediment, bar or difficulty that you encountered or recognized in making a game that had a ball, and paddles that were operated interactively, using these other components?

A Well, certainly, life was a lot more difficult having to go the discrete route, that is, the route of the use of individual components, than if we had had the option of taking standard integrated circuits and connecting them together.

Q Are you saying the integrated circuits would have been easier or more difficult to build a game?

A The integrated circuits would have been easier, because we had a clear function to perform in such areas as coincidence detection, in such areas as summing, because by that time those signals are logic level signals, and many other areas, and it would have been a very simple matter, as it is today, to take integrated circuits out of the bin or out of the drawer and interconnect them, except that we couldn't afford them.

THE COURT: What is an integrated circuit?

THE WITNESS: An integrated circuit, your Honor, is a collection of transistors and resistors and diodes on one single solid semiconductor slice, usually silicon, so that in the space of a small sliver of silicon, it might measure a hundred thousandths by an eighth of an inch.

MR. ANDERSON: No further redirect.

MR. GOLDENBERG: Your Honor, just one quick question.

FURTHER RECROSS EXAMINATION

BY MR. GOLDENBERG:

Q Do you recall the selling price of the Odyssey 1 TL 200 when it first came on the market?

A Yes.

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Q Could you tell us that price, sir?

A \$100 -- or \$99.95. It made my hair stand on end.

Q It did not achieve your objective of 29.95, did it?

A No, it didn't.

MR. GOLDENBERG: Thank you. I have no further questions.

THE COURT: All right, Mr. Baer, you may step down.

(Witness excused.)

THE COURT: We will recess until 10:00 o'clock.

(Whereupon an adjournment was taken at 5:45 p.m. to 10:00 a.m. of the following day, Tuesday, December 28, 1976.)